

# Lewis University

## STEM Undergraduate Research Experience

### Faculty Mentor - Project Application

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*Using Mathematical Models to Simulate Disease Transmission and Identify Optimal Prevention Strategies*

#### **Abstract**

Infectious disease models can provide detailed insight into the transmission dynamics of pathogens and, thereby, facilitate the evaluation of disease surveillance, control strategies, and their effectiveness. Using mathematical models, together with appropriate parameter values, we can simulate outbreaks in order to predict emerging behaviors, assess the impact of intervention strategies, and support decisions for disease control. Mathematical models come in a variety of forms; for example, they can be either deterministic or stochastic and either discrete or continuous. Oftentimes several different forms are used to model the same disease, where each model type may focus on a distinct aspect of disease spread. In this project, students will work on improving an existing model of the spread of *Clostridioides difficile* infection or focus on another infectious disease of their choosing. After the model is developed, students will run simulations and use the resulting output to draw conclusions about how best to prevent the spread of the disease.